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Prospective teachers' information and communication technology metaphors

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Abstract

Determination of the perceptions of the prospective teachers about Information and Communication Technology (ICT) terms has a remarkable potential to provide input for technology integration plans and ICT training. Within this context, the purpose of this study is to discover the metaphors constructed by prospective teachers for ICT terms. Data were gathered from 180 prospective teachers through a survey. 977 valid metaphors constructed by the participants were grouped into conceptual categories for the six ICT terms. The most common conceptual categories are "developing and changing" for technology, "making life easy" for computers and search engines, "limitless and endless" for the Internet, "means of communication" for social networks, and "addictive items" for video games. Future research should concentrate on investigating the match and mismatches between the intended use of the ICT tools and the perception of the prospective teachers.

Keywords: metaphors, ICT, information and communication technology, technology integration, pre-service teacher, teacher education, prospective teachers.

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1. Introduction

The use of technology has recently become more common than ever before. The use of technological devices also increased the frequency of the use of words related to technology in our daily lives and in education. Developments in Information and Communication Technology have provided great opportunities for educators to improve teaching and learning. Technology is currently perceived in education as a mean of enhancing teaching and learning. In order to integrate technology efficiently into educational processes, it is necessary for teacher educators to know how technology and terms related to the technology are perceived by prospective teachers. When teacher candidates have sufficient instruction during their education, they have positive opinions for instruction using technology and they believe that it is effective (Morrison & Jeffs, 2005).

A significant qualification of technology is that it eliminates limits in education, transfers learning processes outside the class, and therefore enables learning during the entire day and life. This also supports life-long learning which has become quite popular recently due to the fact that learning should not be limited to the education offered at school; it should continue during one's entire life, because new knowledge is generated very rapidly. In order to make use of technology in teaching to support efficient learning and to supply learners with life-long learning skills, it is essential for educators to know how students perceive forms of technology such as social networks, search engines and video games. It has been indicated that prospective teachers' behavioral approaches and perceptions of the technologies that they are going to make use of in their classrooms have a strong influence on their future perceptions and eagerness to use technology in their teaching environments (Teo & Lee, 2010).

The use of metaphors can provide extensive information about how individuals categorize the terms related to ICT. Metaphors are defined as figures of speech used in all disciplines (Pannabecker, 1991). Metaphors involve the transfer of descriptive terms from primary usage to different, but analogous situations (Joerges, 1990; Ortony, 1979; Pannabecker, 1991; Sacks, 1979; Simpson & Weiner, 1989; Winner, 1986). In a more specific sense, a metaphor can be defined as a powerful mental concept used by people for trying to understand and explain an abstract, complex or theoretical concept or event (Saban, Kocbeker & Saban, 2007). According to Koc (2013), metaphors reflect personal beliefs, attitudes or feelings about a subject or situation. To explain the use of metaphors in social sciences as a research tool, Koc (2013) emphasizes that metaphors are used to gain insight into individuals' thinking and reasoning. Thus, questioning metaphors generated by prospective teachers about ICT terms is much more effective than learning how prospective teachers define the terms for the ICT.

Several studies have been conducted to investigate the use of metaphors mainly for computers and technology. Kobak & Taskin (2012) conducted a study with 104 senior prospective teachers. They classified the metaphors of the participants about the concept "technology". The results revealed that metaphors constructed by prospective teachers are grouped into9 categories: developing and changing technology, rapidly progressing technology, limitless, endless technology, beneficial technology, harmful technology, both beneficial and harmful technology, unputdownable technology, technology as a necessity, and all inclusive technology.

A similar study was conducted by Koc (2013) with 237 students studying in a technical pre-service teacher education program. Findings revealed that there were five conceptual categories organizing the metaphors about the technology. These concepts were development, facilitation, vital necessity, power and threat. According to the results, it was also found that the use of metaphors by prospective teachers is limited, as they mostly concentrated on technical dimensions of the technology when constructing the metaphors.

In a study conducted with 1st, 2nd, 3rd and 4th grades in the Computer Teacher Department to find out student teachers' perceptions of social networks, Gurol & Donmus (2010) grouped metaphors generated by participants into seven conceptual categories: rapidly developing and changing,

communication, correspondence and sharing, addictive, positive, negative, both positive and negative, and an indispensable platform.

The study conducted by Gecer (2013) with 513 second grade primary school students aimed to find out the computer self-efficacy perception of students and their opinions regarding computer ownership through metaphors. The metaphors that students generated about having a computer were grouped into 11 conceptual categories: having a reference guide, a good feeling and having a friend, having a precious object, a particular place or traveling, a power icon, a vehicle, human-specific characteristics, business, an animal, a private object and negative feelings.

Studies investigating metaphors used for the computer and for technology can be found in the literature (Gecer, 2013; Gurol & Donmus, 2010; Kobak & Taskin, 2012; Koc, 2013). However there is no single study investigating the metaphors for the terms used in Information Communication Technology which are frequently used by the stakeholders of the education adventure. Prospective teachers play a key role in the integration and use of ICT in schools. Determination of the perceptions of prospective teachers for ICT terms has a remarkable potential to provide input for technology integration plans and ICT training. Within this context, the purpose of this study is to discover the metaphors constructed by prospective teachers for ICT terms. This study aims to seek answers for the following research questions:

1. Which metaphors do prospective teachers use to portray the terms for technology, computers, the internet, search engines, social networks and video games?
2. How frequently are the metaphors used by prospective teachers to portray the terms for technology, computers, the internet, search engines, social networks and video games?
3. How do prospective teachers justify metaphors for the ICT terms that they have constructed?

2. Methodology

2.1. Design of the Study

A qualitative survey (Jansen, 2010), which is a recently-emerging type of qualitative research, was used in the study. In qualitative research, the researchers focus on the meanings generated by individuals; that is, how individuals assign meaning to the phenomena and their experiences is the concern of qualitative research (Merriam, 2009). In an epistemological context, qualitative research provides a descriptive analysis of a context or phenomenon by using participant observation or case studies (Parkinson & Drislane, 2011). There were two open-ended questions in the survey. The first was designed to gather the metaphors constructed by the prospective teachers for the six ICT terms, and the second was designed to ask respondents to justify the metaphors for the ICT terms that they constructed.

2.2. Participants

The participants of the study were 180 freshmen prospective teachers studying at the Education Faculty of a State university located in the Black Sea region. Prospective teachers studying in the Early Child Education and the Special Education departments in 2013-2014 academic years were selected among volunteers. The reason for selecting these departments was that they have the highest number of students that can represent the entire faculty. The distribution of the participants based on their departments and genders is provided in Table 1.

Table 1. Distribution of the participants based on their gender and programs

		Undergraduate Programs					
		Early Childhood Ed.		Special Ed.		Total	
		f	%	f	%	f	%
Gender	Male	12	11,8	31	39,2	43	23,8
	Female	89	88,1	48	60,7	137	76,1
Total		101	100	79	100	180	100

2.3. Data Collection Tool

Participants were asked to complete six questions in the survey to form metaphors. Each survey question was constructed asking participants to write the metaphor for the ICT term and the reason for choosing that metaphor. The data collection tool was prepared by the researcher by choosing the most widely-used terms about technology based on a comprehensive literature review.

2.4. Data Analysis

Participants responded to a total number of 1080 questions for the six ICT terms. Content analysis was applied to analyze the qualitative data. The first stage of the data analysis included exclusion and coding. Preliminary analysis of the data revealed that some participants did not use metaphors in their answers. Therefore these answers were eliminated and not included in the analysis. Similarly, some participants did not provide explanation for the metaphors in the survey, so their answers were also excluded from the analysis. After the elimination of the unacceptable answers, a total number of 977 metaphors remained for the analysis.

In the next step, the content analysis process was initiated. Metaphors were alphabetically listed and a sample explanatory sentence best describing the metaphor was selected for each metaphor. Then the metaphors formed by the participants were analyzed in terms of their common features related to the keywords. Conceptual categories were formed for each keyword associating each metaphor with a certain theme.

3. Results

3.1. Findings for the First research question

The conceptual categories formed after the elimination of irrelevant or absent data for each keyword are provided in Table 2.

Table 2. Categories formed for the keywords

Keywords	Conceptual Categories	Metaphor Names
Technology	Developing and changing	flower, plant, tree, human, child, river, baby, chameleon, living thing, earth, city, life, body, infinity, day, progress, horse, life, capitalism, black hole, writing, hairdresser, monkey, seasons, water, numbers, historic identity, outer space, pyramid, rain
	Limitless, endless	Earth, sky, outer space, tree, living thing, circle, avalanche, abyss, line in geometry, dreaming, numbers
	Making life easy	mother, robot, Hercules, Popeye, Spiderman, a hero performing magic, scientist, donkey, Earth, girl
	Necessities	Water, tree, bread, sun, life, light, organs, market, inspector gadget, Zeus
	Beneficial items	library, forest , sun, Aladdin's lamp, magic window, magic world, donkey, cow, lost property room, saver
	Tools	Gear, vacuum cleaner, F5 key, pencil, box, hourglass, mixer, kitchen tools, toy
	Both beneficial and harmful	humans, nuclear energy, weapon, dinosaur, sun, sea, life
	Rapidly progressing	cheetah, rocket, dream, time, surfing
	Small animals	bird, louse, butterfly, virus
	Food	walnut, water, fried egg with meat
	Harmful items	bomb, sandwich with jam, cat
	Vehicles	car, train
	Hardworking animals	bee
	Big animals	lion
	Addictive items	Nutella
Computers	Making life easy	library, intelligence, colt, robot, heartless person, octopus, mother, archive, myself, empty land, house, suitcase, sun, dough, intelligent person, human, the Jetsons, women, kangaroo, ant, turtle, all-inclusive thing, wise man, kitchen, teacher, rucksack, superman
	Organs	brain, veins of brain, veins, heart, nervous system, body
	Limitless, endless	Earth, universe, box, jigsaw puzzle, a lady's bag, living things kingdom, factory, safe, Matruska doll, item, encyclopedia, vacuum cleaner, road
	Tools	box, refrigerator, flight recorder, notebook, cupboard, memory stick, women's memory, cauldron, book, bookshelf, jewelry box, television
	Necessities	darling, spiced chips, building base, living thing, washing machine, limbs, house, book, chicken, girl, life, meal
	Beneficial items	human, close friend, cow, turtle, encyclopedia, fun box, vacuum cleaner, book
	Both beneficial and harmful	corn, human, knife, television, robot
	Fast animals	horse, cheetah, atom ant
	Harmful items	terrorist, monster, poisoned apple, vacuum
	Addictive items	chocolate, honey, virus, cigarette
	Big animals	lion, dog, Cyclops
	Developing and changing	chameleon, Sultan Mehmet the Conqueror, Metehan
	Vehicles	car, truck

	Hardworking animals	ant
	Means of communication	telephone
	Small animals	puppy
	Limitless, endless	library, ocean, universe, infinity, earth, sea, octopus, encyclopedia, humans, spider , toolbox, grocer, knowledge accumulation, wise man, room full of information, city, cloud, abyss, elephant, life, light speed, book, bookshelf, greengrocer's, teacher, pyramid, magician, magic box, magic broom, historic item, land, space, Joseph Morgan, Mustafa Topaloglu, Spiderman
	Making life easy	book, library, Aladdin's magic lamp, Superman, phone, encyclopedia, animal, 911 service, mother, father, car, friend, wise man, Gargamel, newspaper, sister Guzin, wise engine, St. Hizir, servant, rooms, dictionary, communication network, speaking, Nasreddin Hodja, Spiderman, Robin Hood, plane, vehicles
The internet	Necessities	water, food, life, breathing, salt, hunger, couch, most-liked item, chocolate, house, stuffed mutton balls, ladle, mother, funfair
	Both beneficial and harmful	elephant and rabbit, horse, knife, bear, monster, Pandora's box, circle, vacuum cleaner, high heel shoe, virus, meal, beneficial substance in alcohol
	Organs	brain, veins, nerve cells
	Addictive items	car, makeup, cigarette, air and water, drugs
	Harmful items	illness, monster, virus, dump site
	Slow animals	turtle
	Fast animals	horse, ant
	Developing and changing	Che Guevara, historic identity
	Means of communication	bird, carrier pigeon
	Beneficial items	fun club
	Food	chocolate
	Making life easy	library, encyclopedia, teacher, Superman, vehicle, assistant, book, magnifying glass , Esra Erol, servant , woman , dog , girl , hero , family, smart devices, key, mother, father, parents, mirror, genius mind, easiness, electronic goods, factory workers, map genie, human mind, jet, introduction part, greengrocer, price tag, tongs, angel, stairs, fruit pieces, Nasreddin Hodja's donkey, cooker, compass, clock, exhibition, Sherlock Holmes, dictionary, pilot, flying carpet, old wise man
	Limitless, endless	wise man, library, encyclopedia, woman, earth, archive , shopping center , sea , lady's bag , herbalist, researcher, bucket, wise sister, boutique, dustbin, mountains, matchmaking program, Saint Celebi, Saint, philosopher, lake, life, book, Muge Anlı, Nasreddin Hodja, school, forest, Spiderman's web, Pepe, Father Smurf, chips with taso, space, old man
	Beneficial items	hero of a fairy tale, Tom and Jerry, friend, teacher, milkman, cow, light, antibiotics, bridge, information
	Hardworking animals	ant, bee
	Harmful items	spoilt child, alcohol seller
	Both beneficial and harmful	spy, friend
	Vehicles	ship, vehicle
	Addictive items	alcoholic drink
	Fast animals	cheetah
	Small animals	bird

Social networks	Tools	jigsaw puzzle
	Necessities	tree
	Means of Communication	letter, café, pigeon, telephone, gossip, friends' gathering, Easter, gold day, friends circle, nightingale, rail line, wedding, diary, communication, communication skill, communication device, wire, identity, book, bird, school, holiday resort, party, window, public transport vehicle, train station
	Addictive items	octopus , spider web , cigarette , drug , prison , swamp , alcohol, lion, independence, Burak Ozcivit, ripped stocking, whirlpool, pit, creature, sedative
	Necessities	family, neighbors, friend, alcohol addict, mother, friend circle, gossip, man, matchmaking program, heart, bird, model, happiness, favourite toy, water
	Making life easy	octopus, humans , newspaper boy, journalist, fish, meeting point, café, flat, pigeon, extended family, small child, hero, spider, popular friend, fan group
	Beneficial items	toy, café, game , leisure center , diary, air, spider web, funfair, university
	Harmful items	parrot , notebook of preschool children, big animal, monster, gossipy women, turtle, koala, labyrinth, cigarette, endless road, chicken hen
	Limitless, endless	octopus, spider web, funfair, lace, zoo
	Both beneficial and harmful	candy, dishonest person, herd, shopping mall, slippery bridge
	Developing and changing	postman, virus
	Food	dinner, apple
	Organs	vein
	Small animals	spider
Video games	Addictive items	drugs, cigarette, chocolate, alcohol, heroin, coffee, lion, darling , fire, addiction, addictive substances, myself, illness, beer, chocolate, crossword, Burak Ozcivit, monster, chips, seed, playing house, well, book, cocaine, pasta, nicotine, chewing gum, sugar, collar, Teen Wolf, television, meal
	Beneficial items	funfair, friends, toy, dreams, life, game boy, playing on the street, an item, Alice in Wonderland, myself, Bugs Bunny, lifeguard, Calıkusu, chocolate, playground, game, leisure center, Fenerbahce, football, excitement, coffee, hero, book of tales, listening to music, game room, game, deadly illness, psychologist, clock
	Harmful items	sleep, monster, television, knitting, appendix, empty plate, useless dream, empty room, Fenerbahce, faux pas, unnecessary task, working in vain, dream world, thief, empty flat, cola, puppet, sly friend, dry tissue, painting nails, cigarette, indispensability, tuberculosis, snake, devices stealing time, passing time, time machine, poison
	Both beneficial and harmful	dream, bacteria, chocolate, cat, funfair, appetizer, useless item, clock, television, passion, dungeon
	Limitless, endless	funfair, fishnet, earth, leisure center, gloves, animals, small organisms
	Developing and changing	Tom and Jerry, virus, graveyard
	Fast animals	squirrel
	Making life easy	friend
	Necessities	meal

The metaphors constructed by the participants for the keywords have been grouped into several conceptual categories. As can be seen from Table 2, 15 conceptual categories were formed for the keyword "Technology". For the keyword "Computers", 16 conceptual categories were formed, while

13 conceptual categories were formed for the keyword "The Internet". The number of conceptual categories formed for the keyword "Search Engines" was 12; while that of the keyword "Social networks" was 8 and that of the keyword "Video Games" was 13.

3.2. Findings for the second research question

The frequencies and percentages of the conceptual categories formed after the elimination of irrelevant or absent data for each keyword are provided in Table 3.

Table 3. Distribution of categories formed for the keywords

Keywords	Conceptual Categories	Metaphor Frequency (n)	Metaphor Percentage (%)
Technology	Developing and changing	56	36,3
	Limitless, endless	18	11,6
	Making life easy	15	9,7
	Necessities	14	9,0
	Beneficial items	11	7,14
	Tools	9	5,8
	Both beneficial and harmful	7	4,5
	Rapidly progressing	7	4,5
	Small animals	5	3,2
	Food	3	1,9
	Harmful items	3	1,9
	Vehicles	2	1,3
	Hardworking animals	2	1,3
	Big animals	1	0,6
	Addictive items	1	0,6
	Total:	154	100%
Computers	Making life easy	36	23,5
	Organs	29	18,9
	Limitless, endless	19	12,4
	Tools	14	9,1
	Necessities	13	8,5
	Beneficial items	11	7,19
	Both beneficial and harmful	5	3,2
	Fast animals	5	3,2
	Harmful items	4	2,6
	Addictive items	4	2,6
	Big animals	3	1,9
	Developing and changing	3	1,9
	Vehicles	3	1,9
	Hardworking animals	2	1,3
	Means of communication	1	0,6
	Small animals	1	0,6
	Total:	153	100%
The Internet	Limitless, endless	69	39,8
	Making life easy	38	21,9
	Necessities	25	14,4
	Both beneficial and harmful	13	7,5
	Organs	8	4,62
	Addictive items	5	2,8

	Harmful items	4	2,3
	Slow animals	3	1,7
	Fast animals	2	1,1
	Developing and changing	2	1,1
	Means of communication	2	1,1
	Beneficial items	1	0,5
	Food	1	0,5
	Total:	173	100%
Search Engines	Making life easy	86	50,8
	Limitless, endless	57	33,7
	Beneficial items	10	5,9
	Hardworking animals	5	2,9
	Harmful items	2	1,1
	Both beneficial and harmful	2	1,1
	Vehicles	2	1,1
	Addictive items	1	0,5
	Fast animals	1	0,5
	Small animals	1	0,5
	Tools	1	0,5
	Necessities	1	0,5
	Total:	169	100%
Social Networks	Means of Communication	54	33,3
	Addictive items	21	12,9
	Necessities	19	11,7
	Making life easy	18	11,1
	Beneficial items	15	9,2
	Harmful items	12	7,4
	Limitless, endless	10	6,1
	Both beneficial and harmful	5	3,0
	Developing and changing	2	1,2
	Food	2	1,2
	Organs	2	1,2
	Small animals	2	1,2
	Total:	162	100%
Video Games	Addictive items	62	37,3
	Beneficial items	44	26,5
	Harmful items	33	19,8
	Both beneficial and harmful	12	7,2
	Limitless, endless	9	5,4
	Developing and changing	3	1,8
	Fast animals	1	0,6
	Making life easy	1	0,6
	Necessities	1	0,6
	Total:	166	100%

Table 3 demonstrates that most of the metaphors generated by the participants about the keyword "Technology" are under the conceptual category of "Developing and Changing" (n=56). The highest number of metaphors generated for the keyword "Computers" by the participants is under the category of "Making Life Easy" (n=36). For the keyword "The Internet", the greatest number of metaphors was under the conceptual category "Limitless, endless" (n=69). The category with highest number of metaphors for the keyword "Search engines" is "Making Life Easy" (n=86) while those for the keyword "Social Networks" is "Means of Communication" (n=54) and "Addictive Items" (n=62) for the keyword "Video Games".

3.3. Findings for the third research question

The most common means by which prospective teachers justify the metaphors they constructed for the ICT terms are provided in Table 4.

Table 4. Participants' justifications for the most common metaphors

Keywords	Most Common Category	Justification		Justification Frequency (n)	Justification Percentage (%)
Technology	Developing and Changing	because it evolves continuously		38	67,8
		because it changes continuously		12	21,4
		because it renews itself		4	7,1
		because it develops itself		2	3,5
			Total:	56	100%
Computers	Making life easy	because they store information efficiently		10	27,7
		because they help us		9	25,0
		because they are multifunctional		9	25,0
		because they do everything fast		2	5,5
		because they shape you		1	2,7
		because they solve problems easily		1	2,7
		because they answer questions		1	2,7
		because they are superior to humans		1	2,7
		because they keep everything in memory		1	2,7
		because they teach us		1	2,7
			Total:	36	100%
The Internet	Limitless, endless	because it has all we need		27	39,1
		because it contains lots of information		18	26,0
		because it has no restriction or boundary		8	11,5
		because it is quick and comprehensive		4	5,8
		because it is like a web		3	4,3
		because it is very large		3	4,3
		because it helps our learning process		1	1,4
		because it answers questions		1	1,4
		because it is everywhere		1	1,4
		because it looks endless but actually it is not		1	1,4
		because it is like a city		1	1,4
		because it is mysterious		1	1,4
			Total:	69	100%
Search Engines	Making life easy	because we can find all we are looking for		29	33,7
		because they help us		12	13,9
		because they answer our questions		8	9,3
		because they meet our needs		8	9,3
		because they know everything		5	5,8
		because they provide access to knowledge		5	5,8
		because they take you everywhere		4	4,6
		because they lead to the target		3	3,4
		because they offer choices		2	2,3
		because they make access to knowledge easier		2	2,3
		because they enhance learning		2	2,3
		because they select useful knowledge		1	1,1

		because they maintain communication	1	1,1
		because they are smart	1	1,1
		because they provide results if you use them well	1	1,1
		because they are different from human minds	1	1,1
		because they are companions	1	1,1
		Total:	86	100%
Social Networks	Means of Communication	because they allow us to communicate with other people	25	46,3
		because they make communication easier	5	9,2
		because they help communication	5	9,2
		because they enable us to share things with people	5	9,2
		because they enable us to meet new people	4	7,4
		because they bring friends living far away closer	2	3,7
		because they provide us with personal information	2	3,7
		because they provide unlimited communication	2	3,7
		because they provide opportunities to exchange information	2	3,7
		because they provide a new environment	1	1,8
		because they enhance curiosity	1	1,8
		Total:	54	100%
Video Games	Addictive items	because they cause addiction	34	54,8
		because they occupy you deeply	12	19,3
		because you want to eat more	4	6,4
		because you want to play more	3	4,8
		because they cause loss of time and money	3	4,8
		because you can't give up although they are harmful	2	3,2
		because they make you happy	1	1,6
		because they are like an epidemic	1	1,6
		because they never fully satisfy you	1	1,6
		because they are harmful	1	1,6
		Total:	62	100%

The most common justifications of the participants for the most common conceptual categories for the ICT metaphors are "because it evolves continuously" for developing and changing technology,; "because they store information efficiently" for computers making life easy, "because it has all we need" for limitless, endless internet; "because we can find all we are looking for" for search engines making life easy; "because they allow us to communicate with other people" for social networks as a means of communication and "because they cause addiction" for video games as addictive items.

4. Discussion and Conclusion

The purpose of this study is to discover the metaphors constructed by prospective teachers for ICT terms. Results revealed that the most common conceptual categories are developing and changing for the technology, making life easy for the computers and search engines, limitless and endless for the Internet, means of communication for the social networks, and addictive items for the video games. These findings reveal the perceptions of prospective teachers on ICT terms.

The participants used "developing and changing" as a conceptual category for the term "technology". When making a justification for this category they said that technology evolves continuously. Development and change were the key aspects of the technology according to the participants. This can be considered as an expected metaphor given the amazing rate at which

technology is improving. Prospective teachers emphasized the ongoing change feature of the technology. Similarly, Kobak & Taskin (2012) & Koc (2013) also found that prospective teachers use development and change to describe technology. On the other hand, Pannabecker (1991) indicated that technology is a dynamic force leading to collisions or impacts on society. It is clear that the results of studies with recent dates are similar. However, Pannabecker (1991) considers technology as an impact. It can be concluded that technology is no longer having a big impact on society, but its evolution at an amazing rate is emphasized.

Similarly for computers, "making life easy" was used as a conceptual category. In order to justify this metaphor, participants indicated that computers store information efficiently. Effective information storage capability of the computers seems to attract prospective teachers. Teachers might consider computers as effective tools to aid their teaching, so they emphasize the information storage feature, which could help in storing lesson contents. The metaphor, "limitless endless", was used as a metaphor to describe the internet. Prospective teachers indicated that the internet has all they need. Considering the main features of the internet, the internet is not only used to access the information but is also used for communication. Prospective teachers seem to utilize both features of the virtual environment. Taking into account the growing amount of information and wide range of contents available on the internet, this finding indicates that teachers are making use of a great deal of the online content.

"Making life easy" was used as a metaphor for the search engines. In order to justify this metaphor, participants indicated that they could find everything they are looking for. While the internet is used for accessing information and communication, search engines are only used to access information. It can be commented that the teachers are using search engines not only for searching for information but also for accessing information in all aspects of life because of the emphasis on the word "life". On the other hand, social networks are seen as a "means of communication". While justifying for this metaphor, participants indicated that social networks allow them to communicate with other people. It is understood that social networks are not the only mean for communication. Prospective teachers appear to use other communication means of communication. This result is similar to the findings of the Gurol and Donmus (2010) study on social networks. Finally, for video games, "addictive items" was used as a conceptual category. In order to justify this metaphor, participants indicated that video games cause addiction. Video games are seen as a problem by prospective teachers as is the case for individuals in different age groups.

Pannabecker (1991) used the metaphor "technological impacts" to indicate that technology is a discrete force with a discernible direction and influence. Since it influences all walks of life, it also affects education profoundly. It has been emphasized that technology implementation requires profound changes in the role of teachers and their epistemological views (Koc, 2013). When all metaphors created under the categories are considered, it can be concluded that they are generally positive, except those for video games. In similar studies by Abboud-Blancard (2005), Eyyam, Menvis and Dogruer (2010), Tinmaz (2004), and Usta and Korkmaz (2010), the metaphors were found to be positive as well. In line with the findings of the current study, Gok & Erdogan (2010) indicated that prospective teachers' metaphors mostly focus on "developing and changing" technology. Learning the perception of the prospective teachers for the ICT terms is important in order to take protective action to change the undesirable perceptions of the prospective teachers about the ICT that is widely used in schools. In Koc (2013)'s study, it was emphasized that prospective teachers' conception of technology is restricted, focusing mostly on artifact and technical dimensions. In order to avoid this restriction, the curriculum should have a broader approach towards technology.

Metaphors are significant research tools, which can be used to obtain the mental images of individuals regarding the concepts and phenomena. Understanding the prospective teachers' perceptions related to information and communication technology has the potential to provide input for technology integration endeavors. Prospective teachers will be role models in schools for the students and experienced teachers for their use of information and communication technology.

Therefore, timely data on the issue is critical to plan the ICT education in teacher education programs. Future research should concentrate on investigating the matches and mismatches between the intended use of the ICT tools and the perceptions of the prospective teachers.

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